

2021

Zsafia Pasztor



**TREE RETENTION NOTES SEPTEMBER
2021**

Tree Retention Notes September 2021



Zsafia Pasztor
Certified Horticulturist CPH 2459
Arborist PN-5795A, Tree Risk Assessor Qualified
Landscape Designer; Certified LID Consultant
10 – 108th St. SE
Everett, Washington 98208
425-210-5541
zs.pasztor2011@gmail.com

Dear Mr. Mullins,

During August and September 2021 some changes to the retention areas were recommended by the City.

Definition of the assignment

You contacted me because you are working on the permitting process with the City. You need my evaluation regarding the site visit and findings.

Summary of findings

As construction for the planned Issaquah High School 4 and Elementary School 17 will encompass a large area, it is necessary to establish the existing site conditions to ensure the preservation of site characteristics and natural life. The current site features many large and small trees, with copses of starts and old growth. To ensure that the local features are not completely removed, the City recommended a site walk to record the current small tree coverage on site and in the site buffer.

On August 31, 2021, a site walk was conducted by a representative of AHBL. The site walk occurred between the hours of 1230 and 1500, during which the perimeter of the site was walked and data on trees was recorded and photographed. A total of 226 trees were viewed, all of which contributed to the total recorded tree diameter of 857 inches. The tree diameter is high in relation to the goal coverage of 450 inches. Two tables attached below detail the summary of all trees viewed on site and the individual characteristics of all trees viewed. An additional exhibit shows the location of all viewed trees.

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Field Data



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Summary of Trees on Site

PROJECT: Issaquah High School
PREPARED BY: Amelia Davison
DATE: Sept. 03, 2021

Tree Type	Number of Trees	Cumulative Diameter (inches)
Alder	65	369
Cedar	25	78
Cottonwood	11	34
Fir	1	1
Holy	4	8
Maple	103	315
Starts	2	0
Unknown	15	52
	226	857

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Recorded Trees on Site

PROJECT: Issaquah High School
PREPARED BY: Amelia Davison
DATE: Sept. 03, 2021

	Point Number	Time of Photo	Tree Species	Tree Size (inches)	Number of Trees	Total Size (inches)
Total					226	857
	1	12.36	CEDAR	4	1	4
	2	12.37	UNKNOWN	2	1	2
	3	12.37	CEDAR	2	1	2
	4	12.38	MAPLE	3	1	3
	5	12.39	ALDER	2	1	2
	6	12.40	ALDER	5	1	5
	7	12.41	CEDAR	3	1	3
	8	12.41	MAPLE	3	1	3
	9	12.42	MAPLE	1	1	1
	10	12.42	CEDAR	3	1	3
	11	12.43	MAPLE	5	1	5
	12	12.44	CEDAR	2	1	2
	13	12.45	ALDER (STARTS)	1	1	1
	14	12.47	MAPLE	0	1	0
	15	12.47	CEDAR	3	1	3
	16	12.48	MAPLE	0	1	0
	17	12.49	MAPLE	6	1	6
	18	12.50	ALDER	4	1	4
	19	12.52	MAPLE	2	1	2
	20	12.53	MAPLE	4	1	4
	21	12.54	CEDAR	3	2	6
	22	12.54	CEDAR	6	1	6
	23	12.55	NURSE LOG	4	1	4

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24	12.56	FIR	2	4	8
25	12.57	ALDER	4	1	4
26	12.58	MAPLE	3	1	3
27	13.00	MAPLE	1	5	5
28	13.00	MAPLE	3	1	3
29	13.01	MAPLE	1	1	1
30	13.01	MAPLE	2	1	2
31	13.01	UNKNOWN	4	1	4
32	13.03	CEDAR	3	1	3
33	13.03	CEDAR	4	1	4
34	13.04	UNKNOWN	5	1	5
35	13.04	ALDER	2	2	4
36	13.05	MAPLE (STARTS)	0	1	0
37	13.05	MAPLE	1	1	1
38	13.05	MAPLE	2	3	6
39	13.05	MAPLE	3	1	3
40	13.06	FIR	0.33	3	1
41	13.07	CEDAR	3	1	3
42	13.07	UNKNOWN	0	1	0
43	13.08	MAPLE	0	1	0
44	13.08	FIR	3	1	3
45	13.09	MAPLE (STARTS)	1	0	0
46	13.11	COTTONWOOD	3	1	3
47	13.11	ALDER	0	1	0
48	13.12	MAPLE	0.50	4	2
49	13.12	MAPLE	2	1	2
50	13.13	MAPLE	2	1	2
51	13.14	MAPLE (STARTS)	6	1	6
52	13.14	ALDER	1	1	1
53	13.15	MAPLE	5	1	5
54	13.15	MAPLE	3	1	3
55	13.16	ALDER	7	1	7
56	13.16	STARTING FOREST	6	1	6
57	13.17	ALDER (STARTS)	6	1	6
58	13.17	ALDER	10	1	10
59	13.18	MAPLE	10	1	10
60	13.19	MAPLE	0.50	1	0.5
61	13.19	MAPLE	0	0	0

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Data Information	62	13.20	UNKNOWN	3	1	3
	63	13.21	ALDER	3	1	3
	64	13.22	MAPLE	4	1	4
	65	13.23	MAPLE	4	1	4
	66	13.23	MAPLE	2	1	2
	67	13.24	MAPLE	1	1	1
	68	13.24	MAPLE	1	5	5
	69	13.24	ALDER	0	0	0
	70	13.25	MAPLE	6	1	6
	71	13.26	MAPLE	2	1	2
	72	13.26	UNKNOWN	0	1	0
	73	13.27	MAPLE	3	1	3
	74	13.27	MAPLE	4	1	4
	75	13.28	CEDAR	2	1	2
	76	13.29	ALDER	0	0	0
	77	13.29	MAPLE	5	1	5
	78	13.30	ALDER	3	2	6
	79	13.30	MAPLE	3	1	3
	80	13.31	ALDER	0	1	0
	81	13.31	ALDER	5	1	5
	82	13.32	MAPLE	1.50	3	4.5
	83	13.33	UNKNOWN	3.20	5	16
	84	13.33	MAPLE	4	1	4
	85	13.34	MAPLE	3	1	3
	86	13.34	MAPLE	8	1	8
	87	13.34	MAPLE	4	1	4
	88	13.34	MAPLE	6	1	6
	89	13.34	MAPLE	5	1	5
	90	13.35	MAPLE	3	2	6
	91	13.35	ALDER	4	1	4
	92	13.36	MAPLE (STARTS)	2	1	2
	93	13.36	UNKNOWN	4	2	8
	94	13.37	ALDER	0	1	0
	95	13.38	ALDER	0	0	0
	96	13.39	UNKNOWN	20	1	20
	97	13.40	ALDER	4	3	12
	98	13.41	MAPLE	0	1	0
	99	13.41	CEDAR	15	1	15
	100	13.49	HOLY	30	1	30
	101	13.49	ALDER	4	1	4
	102	13.50	ALDER	4	6	24

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103	13.51	MAPLE	3	1	3
104	13.51	ALDER	3	1	3
105	13.52	MAPLE	0	1	0
106	13.56	CEDAR	6	1	6
107	13.56	ALDER	5	1	5
108	13.57	UNKNOWN	5	1	5
109	13.57	CEDAR	30	1	30
110	13.59	ALDER	2.5	2	5
111	13.59	ALDER	6	1	6
112	14.00	COTTONWOOD	50	1	50
113	14.01	UNKNOWN (STARTS)	0	1	0
114	14.01	MAPLE	20	1	20
115	14.02	UNKNOWN	20	1	20
116	14.03	MAPLE	0	0	0
117	14.03	ALDER	3.33	3	10
118	14.04	ALDER	1.43	7	10
119	14.05	COTTONWOOD	3	4	12
120	14.06	MAPLE	4	1	4
121	14.06	MAPLE	3	6	18
122	14.07	MAPLE	3	9	27
123	14.09	UNKNOWN	12.50	2	25
124	14.09	MAPLE	2.50	2	5
125	14.10	MAPLE	2.67	3	8
126	14.11	MAPLE	3	2	6
127	14.12	UNKNOWN	1.20	5	6
128	14.14	CEDAR	40	1	40
129	14.15	CEDAR	0	1	0
130	14.17	ALDER	2	5	10
131	14.18	ALDER	5	1	5
132	14.22	UNKNOWN	4	1	4
133	14.22	ALDER	4	1	4
134	14.23	MAPLE	3	2	6
135	14.23	ALDER	3	4	12
136	14.24	MAPLE	4	2	8
137	14.25	MAPLE	15	1	15
138	14.27	UNKNOWN	0	1	0
139	14.27	CEDAR	2	1	2
140	14.28	CEDAR	3	3	9

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141	14.29	ALDER	1.80	5	9
142	14.31	ALDER	2	1	2
143	14.40	CEDAR	3	4	12
144	14.42	CEDAR	4	1	4



This image above is a typical understory of the site. Trees additionally observed are under 6" dbh.

Should you have any questions or concerns, or if I may be of further assistance, please call.

Sincerely,

Zsafia Pasztor;

Certified Horticulturist Cert. # 2459

Certified Arborist Cert. # PN5795A;

Certified Tree Risk Assessor Cert. # 480

Certified LID Consultant and Designer

Landscape Designer and Construction Consultant

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ATTACHMENT 1 – GLOSSARY

Terms Used in This Report, on the Tree Condition and Their Significance

In an effort to clearly present the information for each tree in a manner that facilitates the reader's ability to understand the conclusions I have drawn for each tree, I have collected the information in a report format. This report was developed by Zsafia Pasztor and it is based upon the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface* course manual and the *Tree Risk Assessment Form*, both sponsored by the International Society of Arboriculture, and the *Hazard Tree Evaluation Form* from the book, *The Evaluation of Hazard Trees in Urban Areas*, by Matheny and Clarke. The descriptions were left brief in the report in an effort to include as much pertinent information as possible, to make the report manageable, and to avoid boring the reader with infinite levels of detail. However, a review of these terms and descriptions will allow the reader to rapidly move through the report and understand the information.

- 1) **TREE LOCATION**--indicates what general area of the site the tree is on, or whether the tree is Off the Project property.
- 2) **TREE #**—the individual number of each tree.
- 3) **SPECIES**—this describes the species of each tree with both most readily accepted common name and the officially accepted scientific name.
- 4) **DBH**—Diameter-at-Breast-Height. This is the standard measurement of trees taken at 4.5 feet above the average ground level of the tree base.
 - i) Occasionally it is not practical to measure a tree at 4.5 feet above the ground. The most representative area of the trunk near 4.5 feet is then measured and noted on the spreadsheet. For instance, a tree that forks at 4.5 feet can have an unusually large swelling at that point. The measurement is taken below the swelling and noted as, '28.4" at 36"'.
 - ii) Trees with multiple stems are listed as a "clump of x," with x being the number of trunks in the clump. Measurements may be given as an average of all the trunks, or individual measurements for each trunk may be listed.
 - iii) Every effort is made to distinguish between a single tree with multiple stems and several trees growing close together at the bases.
- 5) **DRIP LINE**—the radius, the distance from the trunk to the furthest branch tips (sometimes the average of these measurements around the tree).
- 6) **% LCR**—Percentage of Live Crown Ratio: the relative proportion of green crown to overall tree height. This is an important indication of a tree's health. If a tree has a high percentage of Live Crown Ratio, it is likely producing enough photosynthetic activity to support the tree. If a tree has less than 30 to 40% LCR it can create a shortage of needed energy and can indicate poor health and vigor.

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7) **SYMMETRY**—is the description of the form of the canopy. That is, the balance or overall shape of the canopy and crown. This is the place I list any major defects in the tree shape—does the tree have all its foliage on one side or in one unusual area. Symmetry can be important if there are additional defects in the tree such as rot pockets, cracks, loose roots, weak crown etc. Symmetry is generally categorized as Generally Symmetrical, Minor Asymmetry or Major Asymmetry:

- i) Gen. Sym.—Generally Symmetrical. The canopy/foliage is generally even on all sides with spacing of scaffold branches typical for the species, both vertically and radially.
- ii) Min. Asym.—Minor Asymmetry. The canopy/foliage has a slightly irregular shape with more weight on one side but appears to be no problem for the tree.
- iii) Maj. Asym.—Major Asymmetry. The canopy/foliage has a highly irregular shape for the species with the majority of the weight on one side of the tree. This can have a significant impact on the tree's stability, health and hazard potential—especially if other defects are noted such as cracks, rot, root defects.

8) **FOLIAGE/BRANCH**—describes the foliage of the tree in relation to a perfect specimen of that particular species. First the branch growth and foliage density is described, and then any signs or symptoms of stress and/or disease are noted. The condition of the foliage, or the branches and buds for deciduous trees in the dormant season, are important indications of a tree's health and vigor.

i) For Deciduous trees in the dormant season:

- The structure of the tree is visible,
- The quantity and quality of buds indicates health, and is described as
- good bud set, average bud set, or poor bud set. These are abbreviated
- in the spreadsheet as: gbs, abs, or pbs.
- The amount of annual shoot elongation is visible and is another major
- indication of tree health and vigor. This is described as:
 - a) Excellent, Good, Average, or Short Shoot Elongation. These are abbreviated in the spreadsheet as ESE, GSE, ASE, OR SSE.

ii) For evergreen trees year round and deciduous trees in leaf, the color and density of the foliage indicates if the tree is healthy or stressed, or if an insect infestation, a bacterial, fungal, or viral infection is present. Foliage is categorized on a scale from:

- Dense—extremely thick foliage, an indication of healthy vigorous
- growth,
- Good—thick foliage, thicker than average for the species,
- Normal/Average—thick foliage, average for the species, an indication
- of healthy growth,
- Thin or Thinning—needles and leaves becoming less dense so that
- sunlight readily passes through; an indication that the tree is under
- serious stress that could impact the long-term survivability and safety
- of the tree,
- Sparse—few leaves or needles on the twigs, an indication that the tree
- is under extreme stress and could indicate the future death of the tree
- Necrosis—the presence of dead twigs and branchlets. This is another
- significant indication of tree health. A few dead twigs and branches
- are reasonably typical in most trees of size. However, if there are dead

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- twigs and branchlets all over a certain portion of the tree, or all over
- the tree, these are indications of stress or attack that can have an
- impact on the tree's long-term health.
- Hangers—a term to describe a large branch or limb that has broken off
- but is still hanging up in the tree. These can be particularly dangerous
- in adverse weather conditions.

9) **CROWN CONDITION**—the crown is uppermost portion of the tree, generally considered the top 10 to 20% of the canopy or that part of the canopy above the main trunk in deciduous trees and above the secondary bark in evergreen trees.

i) The condition of the tree's crown is a reflection of the overall health and vigor of the entire tree. The crown is one of the first places a tree will demonstrate stress and pathogenic attack such as root rot.

ii) If the **Crown Condition** is healthy and strong, this is a good sign. If the crown condition is weak, broken out, or shows other signs of decline, it is an indication that the tree is under stress. It is such an important indication of health and vigor that this is the first place a trained forester or arborist looks to begin the evaluation of a tree. Current research reveals that, by the time trees with root rot show significant signs of decline in the crown, fully 50% or more of the roots have already rotted away. **Crown Condition** can be described as:

- Healthy Crown—exceptional growth for the species.
- Average Crown—typical for the species.
- Weak Crown—thin spindly growth with thin or sparse needles.
- Flagging Crown—describes a tree crown that is weak and unable to
- grow straight up.
- Dying Crown—describes obvious decline that is nearing death.
- Dead Crown—the crown has died due to pathological or physical
- injury. The tree is considered to have significant stress and/or
- weakness if the crown is dead.
- Broken out—a formerly weak crown condition that has been broken
- off by adverse weather conditions or other mechanical means.
- Regenerated or Regenerating—formerly broken out crowns that are
- now growing back, Regenerating crowns may appear healthy, average,
- or weak and indicate current health of the tree.
- Suppressed—a term used to describe poor condition of an entire tree
- or just the crown. Suppressed crowns are those that are entirely below
- the general level of the canopy of surrounding trees which receive no
- direct sunlight. They are generally in poor health and vigor.
- Suppressed trees are generally trees that are smaller and growing in the
- shade of larger trees around them. They generally have thin or sparse
- needles, weak or missing crowns, and are prone to insect attack as well
- as bacterial and fungal infections.

10) **TRUNK**—this is the area to note any defects that can have an impact on the tree's stability or hazard potential. Typical things noted are:

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- i) **FORKED**—bifurcation of branches or trunks that often occur at a narrow angle.
 - ii) **INCLUDED BARK**—a pattern of development at branch or trunk junctions where bark is turned inward rather than pushed out. This can be a serious structural defect in a tree that can and often does lead to failure of one or more of the branches or trunks especially during severe adverse weather conditions.
 - iii) **EPICORMIC GROWTH**—this is generally seen as dense thick growth near the trunk of a tree. Although this looks like a healthy condition, it is in fact the opposite. Trees with Epicormic Growth have used their reserve stores of energy in a last ditch effort to produce enough additional photosynthetic surface area to produce more sugars, starches and carbohydrates to support the continued growth of the tree. Generally speaking, when conifers in the Pacific Northwest exhibit heavy amounts of Epicormic Growth, they are not producing enough food to support their current mass and are already in serious decline.
 - iv) **INTERNAL STRUCTURAL WEAKNESS**—a physical characteristic of the tree trunk, such as a **kink, crack, rot pocket, or rot column** that predisposes the tree trunk to failure at the point of greatest weakness.
 - v) **BOWED**—a gradual curve of the trunk. This can indicate an Internal Structural Weakness or an overall weak tree. It can also indicate slow movement of soils or historic damage of the tree that has been corrected by the curved growth.
 - vi) **KINKED**—a sharp angle in the tree trunk that indicates that the normal growth pattern is disrupted. Generally this means that the internal fibers and annual rings are weaker than straight trunks and prone to failure, especially in adverse weather conditions.
 - vii) **GROUND FLOWER**—an area of deformed bark near the base of a tree trunk that indicates long-term root rot.
- 11) **ROOT COLLAR**—this is the area where the trunk enters the soil and the buttress roots flare out away from the trunk into the soil. It is here that signs of rot, decay, insect infestation, or fungal or bacterial infection are noted. **NAD** stands for **No Apparent Defects**.
- 12) **ROOTS**—any abnormalities such as girdling roots, roots that wrap around the tree itself that strangle the cambium layer and kill the tree, are noted here.
- 13) **COMMENTS**—this is the area to note any additional information that would not fit in the previous boxes or attributes about the tree that have bearing on the health and structure of the tree.
- 14) **CURRENT HEALTH RATING**—A description of the tree's general health ranging from dead, dying, poor, senescent, suppressed, fair, good, very good, to excellent.
- 15) **PNW-ISA TREE RISK ASSESSMENT RATINGS FOR HAZARD POTENTIAL**--The Pacific Northwest Chapter of the International Society of Arboriculture now certifies arborists as *Certified Tree Risk Assessors* using an adjusted scale Low to Extreme. They are:
- i) **TARGET RATING**--A scale of zero to three points depending upon the amount of use within the range of the tree and the amount of injury or damage that might occur if the tree or component part does fail. Target is both the level of use and the quality/value of the target combined with the foreseeable amount of injury or damage that will likely occur should the tree or component part fail.

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- 0 Points, no target. **No Hazard.**
- 1 Point, Low human use is rare and random for short periods of time and/or low target value. (country roads, long-term or overflow parking, remote parks, wilderness trails)
- 2 Points, Moderate human use less than 50% time, occasional (any given time) and/or moderate target value. (picnic areas, camping areas, minor rural roads, moderate use trails)
- 3 Points, Moderately high human use more than 50% of the time, frequent or high value target and/or moderate target value. (bus stops, roads, parking areas, most rarely used vacation homes, playgrounds, etc.)
- 4 Points, High or constant human use and/or high target value. (Schools, hospitals, residential and family homes, utilities, visitor centers, emergency access roads and stations)

ii) **SIZE OF PART--** The larger the tree or component part that fails, the greater the potential for injury or damage.

iii) **PROBABILITY OF FAILURE--** This component ranks the likelihood that the observed defect(s) will fail in a reasonable amount of time in the foreseeable future. The probability of failure automatically has associated with it threshold of action recommended to reduce or minimize the potential failure and associated injuries or damages that might occur.

iiii) **CONSEQUENCES**

16) **ISA HAZARD or RISK RATING--** The combined component ratings used within a specific Matrix.

17) **RECOMMENDATION**— this is an estimate of whether or not the tree is of sufficient health, vigor, and structure that it is worth retaining. Specific recommendations for each tree are included in this column. They may include anything from pruning dead wood, mulching, aerating, injecting tree-based fertilizer into the root system, shortening into a habitat tree or wildlife snag, or to completely removing the tree.

i) **Monitor:** “Monitor” is a specific recommendation that the tree be reevaluated on a routine basis to determine if there are any significant changes in health or structural stability. “Monitor annually” (or bi-annually, triannually, etc.)” means the tree should be looked at once every year (or every 2 or 3 years, etc.) This yearly monitoring can be a quick look at the trees to see if there are any significant changes. Significant changes such as storm damage, loss of crown, partial failure of one or more roots, etc. require that a full evaluation be done of the tree at that time.

		Risk Categorization				Urbithood				Consequences		Risk rating (1-10)				
		Follow-up		Impact		Follow-up & Impact (2017-2021)										
Location number	Tree part	Conditions of concrete	Part code	Risk distance	Target number	Probability	Frequency	How long	Medium	High	Very likely	Highly likely	Very likely	Highly likely	Very likely	Highly likely
1																
2																
3																
4																

Photo 1. Likelihood matrix.

Likelihood of inspecting Target			
Very low	Low	Medium	High
Very low	Very low	Very low	Very low
Low	Low	Low	Low
Medium	Medium	Medium	Medium
High	High	High	High

Photo 2. Risk rating matrix.

Likelihood of follow-up & impact		Consequences of failure		Severity
Very low	Low	High	Very high	
Very low	Very low	Very low	Very low	Very low
Low	Low	Low	Low	Low
Medium	Medium	Medium	Medium	Medium
High	High	High	High	High

Notes, explanations, descriptions

Mitigation options

Residual risk

Residual risk

Overall tree risk rating: Low □ Moderate □ High □ Extreme □ Work priority: 1 □ 2 □ 3 □ 4 □

Overall residual risk: Low □ Moderate □ High □ Extreme □ Recommended inspection interval

Data: [] Preliminary Advanced assessment needed [] No-Tree/Tree

Inspection location: Chain [] Valley [] Downstream [] Upstream [] Root collar [] Crown []

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Two trees may have the same descriptions in the matrix boxes, one may be marked “Hazard,” while another may be marked “Non-Hazard.” The difference is in the degree of the description--early “necrosis” versus advanced “necrosis” for instance. Another example is center rot or base rot. In a Western Red Cedar or Oak tree the presence of low or even moderate rot is not significant and does not diminish the strength of the tree. However, low levels of rot in the base of a Douglas Fir or Big Leaf Maple tree in an area known to have virulent pathogens present is highly significant and predisposes that tree to windthrow. Again, these descriptions were left brief in an effort to include as much pertinent information as possible, to make the report manageable, and, not to bore the reader with infinite levels of detail.

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ATTACHMENT 2– REFERENCES

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